Isles, Prof. Salisbury's present book could be utilised in English schools. Many geographical features can be best illustrated from the open lands of the United States; but the teacher will find in this volume a fair number of references to European countries. We can thus imagine a happy combination in a school course of Salisbury's Elementary Physiography" and, say, A. M. Davies's "Geography of the British Isles."

G. A. J. C.

Mentally Deficient Children, their Treatment and Training. By Dr. G. E. Shuttleworth and Dr. W. A. Potts. Third edition. Pp. xviii+236. (London: H. K. Lewis; Philadelphia: Blakiston's Son and Co., 1910.) Price 5*s.* net.

THE third edition of Dr. Shuttleworth's well-known and excellent handbook has the advantage of an up-to date revision by Dr. Potts. It is not too much to say that Dr. Shuttleworth's small book prepared the way for the recent Royal Commission on Care and Control of the Feeble-Minded. The main conclusions of that commission are dealt with in the present edition. Many details from actual special schools are given. The book is indispensable to those engaged in the management and supervision of feeble-minded children. The eugenics of the feeble-minded are lightly touched upon; but, in a practical handbook, one looks rather for direction than for theory. The illustrations have been increased in number, the bibliography, already copious, has been substantially added to. There is a good index, both of subjects and of authors.

The volume as a whole is so well-balanced that it forms an excellent handbook to the study of this whole department, which, within the last five years, has grown enormously in extent and in interest.

The Flower Book: Being a Procession of Flowers, passing from Meadow and Coppice through the Hedge to the Garden, Pool, and Herb-Patch. By Constance S. Armfield. Pp. ix+153; illustrated. (London: Chatto and Windus, 1910.) Price 7*s.* 6*d.* net.

IT would be difficult to find a more direct contrast to the formal method of nature teaching than the imaginative yet fairly accurate presentation of episodes in plant-life charmingly depicted in the pages of "The Flower Book." The elements and flowers are endowed with voices to express the tale of their difficulties, their ambitions, and their victories. The distress of the stock seedlings when transplanted, the aspirations of the snowdrops and the buttercups, the spread of the pinks in the border, should appeal to the imagination of any bright child, and as natural reasons for the various incidents are cleverly worked into the arguments it may be expected that grains of knowledge will be instilled. One item calls for immediate refutation, that is, the suggested origin of the water plantain from the common plantain. There is a general theme linking together the five sections noted in the title. The illustrations are not an entire success, as some suffer from a want of proportion, but grace and truth are combined in the pictures of the rose, the bluebell, and the iris.

Hygiene and Public Health. By L. C. Parkes and H. R. Kenwood. Pp. xi+691. (London: H. K. Lewis, 1911.) Price 12*s.* 6*d.* net.

IN its original form, the first edition of this book was reviewed at length in our issue of January 30, 1890 (vol. xli, p. 290). The present is the fourth edition under the conjoint authorship; it has been carefully revised, and new matter has been introduced where necessary to bring the treatise up to date.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

Origin of Incense.

IT is natural that incense should interest a botanist. For at least 4000 years mankind has used for this purpose the product of several species of Boswellia, natives of S.E. Arabia and Somaliland (the land of Punt). The English name Frankincense, borrowed from old French, substantially means incense *par excellence*, and represents the fact that, except amongst the Hebrews, it has been the substance exclusively employed in ritual. At last Epiphany frankincense and myrrh, in accordance with custom, were offered at the altar of the Chapel Royal, St. James's, on behalf of the King.

The use of incense might have originated in two different ways, and it is not perhaps always easy to distinguish these developments. Fumigation with fragrant or pungent herbs would easily arise as a sanitary expedient. The Greeks called this *θυμίαμα*, which connects with *fumus*; the plant name, thyme, derives from the same root. This, as there is evidence it did, would develop into the notion of ceremonial purification and then of consecration and honour. For such purposes it would be natural to burn frankincense on a fire-pan or censer. This was the Egyptian practice. Mr. Arthur Evans has discovered in Crete censers of Minoan age with lumps of some undetermined incense still adhering. Much of the use of incense in modern religious ceremonies has only a sanitary significance. Thus, at the coronation of George III., an official held a fire-pan on which frankincense was burnt, and this appears to have had no ritualistic meaning. It was not until the seventh century B.C. that frankincense was exported to Mediterranean countries. It doubtless carried with it is religious significance, and from this period dates the use of incense both by the Greeks and the Hebrews. That incense was of exotic origin is shown by the fact that the Hebrews called it *lebonah* and the Greeks *λιβανωτός*, names which, like the Arabic *lubān*, probably all derive from some local name at the place of production.

The sacrificial use of incense developed gradually and from a different source from the sanitary. Sacrifices were primarily offerings of food to the gods. It was a later development to burn them so as to present them in an ethereal form. Starting from the idea that the gods were to be propitiated through the sense of smell, frankincense was sprinkled on the burnt offerings to make them more fragrant. The latest refinement was to burn incense on the altar alone. The former the Greeks called *λιβανωτὸν ἐπιτιθέναι*, the latter *λιβανωτὸν καθαγίζειν*. Aristophanes in the fifth century B.C. carefully distinguishes (Clouds, 426) the three sacrificial acts: the sacrifice proper (*θύος*), the libation, and the addition of incense.

The use of frankincense spread to Italy, where it was used much as in Greece. The Romans called it *tus*, which is the equivalent of *θύος*. The substitution of the letter *r* in the oblique case, *tus*, *tur-is*, shows that *θύος* could not have found its way into Latin later than the fourth century B.C. In Greece *θύος* was always a sacrificial offering. Mr. Christopher Cookson, who has taken much kind trouble for me in this matter, informs me: "I can find no passage where *θύος* need mean 'incense' and many where it cannot." Now, the Romans had their own word for a sacrifice, *sacrificium*. When they began to use frankincense, instead of borrowing its Greek name, they used *tus*, the latinised form of *θύος*, substituting the name of the whole rite for that of a mere incident in it.

The confusion so produced has existed for some 2000 years. There have been several notices in NATURE of the so-called "Incense Altar of Aphrodite" at Paphos. This is apparently based on the passage in the Odyssey (8.363), where Homer calls it *βωμὸς θυήεις*. But this is merely one of his common forms. He uses it of the altar of Jupiter on Mount Ida (Iliad, 8, 48), and (Il., 23, 148) of the altar of Sperchius, on which Peleus had vowed that Achilles should offer fifty rams. It is quite true that *θυήεις* has been translated "smelling with incense"; it

really has its obvious and simple meaning of "reeking with sacrifice." Virgil was, however, misled, and paraphrases the passage in the Odyssey (Æneid, 1, 416) with his usual amplification into: "centumque Sabaeo ture calent arae." But it is evident that this was not accepted at the time. The elder Pliny more than once discusses the question and asserts emphatically "Iliacis temporibus . . . nec ture supplicabatur" (N. H., 13, 1, 1). Whatever, therefore, may have been the development in later times, the Homeric altar of Aphrodite at Paphos could not have been an incense-altar. It is true that it has been contended that sacrifices of blood were not offered to Aphrodite. But this is not sustainable. Victims were offered to the Paphian Venus in the time of Horace.

W. T. THISELTON-DYER.

The Electromotive Force of Standard Cells.

AT the International Conference on Electrical Units and Standards, held in London in October, 1908, it was decided that the electromotive force of the Weston normal cell should be taken provisionally as 1·0184 international volts at 20° C. until further measurements, made under the auspices of the International Scientific Committee on Electrical Units and Standards, should enable a more accurate value to be assigned.

Measurements of a high degree of accuracy have now been completed, and show that the Weston normal cell made according to approved specifications has an electromotive force of 1·0183 international volts at 20° C., *i.e.* 1 part in 10,000 less than the provisional value assigned in 1908.

In consequence, the International Committee has passed a resolution expressing the desire that from January 1, and until a further recommendation, electrical standardisation in the standardising laboratories of all countries should be based on the value of 1·0183 international volts for the electromotive force of the Weston normal cell at 20° C.

Accordingly, all standard cells tested at the National Physical Laboratory will be compared with Weston normal cells of which the electromotive forces have been determined by direct measurement to be 1·0183 international volts at 20° C. These latter cells, together with new ones, will from time to time be remeasured in terms of the international ohm and the international ampere in order to ensure a constant standard of voltage.

It was assumed in the National Physical Laboratory certificates for 1909 and 1910 that the electromotive force of the Weston normal cell was 1·0184 international volts at 20° C., and therefore these certificates may be corrected for the change now introduced by subtracting 1 part in 10,000 of the value stated on the certificate.

R. T. GLAZEBROOK (*Director*).

The National Physical Laboratory, January 1.

Klaatsch's Theory of the Descent of Man.

THERE appeared in NATURE of December 15, 1910, p. 206, a letter from Prof. Keith on Klaatsch's theory of the descent of man. As this letter is likely to give great discredit to the work of Klaatsch, in this country at least, I find myself, as a pupil of Klaatsch, justified in saying a few words more about it.

Klaatsch gives an account of his theory in a paper, entitled "Die Aurignac-Rasse und ihre Stellung im Stammbaum der Menschheit," in the *Zeitschr. f. Ethnologie*, 1910, Heft 3 and 4. After a short description of the skeleton of the Aurignac man, described by O. Hauser and himself in detail before, and after some general remarks about morphological methods in comparing the fossil man with anthropoid apes, Klaatsch goes on to consider in some detail the comparative anatomy of the humerus, ulna, and radius, and the skeleton of the hind limb of Aurignac and Neanderthal man, orang-utan, and gorilla. As Prof. Keith in his letter says that this basis is "flimsy in the extreme," we may very well examine it again. In the skull, the resemblance between Neanderthal man and gorilla (called the N.-G. group), on one hand, and the Aurignac man and orang (called the A.-O. group) on the other, is hardly visible at all, only in the supraorbital ridges there are still some traces of it. But the resemblances are very well marked in the skeleton of the limbs, especially of the arms. A superficial glance will show that the bones of A.-O. are slender, whilst those of the N.-G. are "clumsy." But this is no basis for exact scientific research; the important point is that there are differences in morphological details. The caput humeri, which articulates with the scapula, has a greater longitudinal diameter in A.-O. and a greater transversal diameter in N.-G. There is a sulcus intertubercularis between two ridges for the insertion of muscles. This runs straight down in A.-O., whilst it is somewhat S-shaped in N.-G. At the distal end, N.-G. shows a much greater mesial epicondyle, so that there results a sort of incision (incisura supracondyloidea, Kl.). In A.-O. the contour of the bone is much straighter; there is no sharp corner at all.

Very interesting differences are found at the proximal end of the ulna, but as this especially is a point where very detailed descriptions and technical terms are necessary, I shall pass at once to the radius. The shaft of that bone —the same holds good in both groups for the ulna—is almost straight in A.-O., but is distinctly bent in N.-G., so that the proximal and distal parts stand to each other in a well-marked angle. In the lower limbs the differences are not so well marked, although there, too, they exist. Differences are observed in the position of the trochanter major and minor, in the formation of the posterior intertrochanteric lines, in the angle between the collum (neck) and the shaft of the femur, in the shape of the malleolus and of the caput of the tibia, and so on. But they are not so striking as in the upper limb. This is quite clear, because the hind-limbs in man are highly specialised for the purpose of supporting the body, so that the influence of function is here much stronger than it is in the arms, which are free, and not always submitted to the same mechanical influences. So the differences are more hidden. But they can be seen by everyone who takes the care of studying the bones thoroughly.

I hope that even this short glance at the facts will have shown to the reader that there are two distinct groups of fossil man, the Aurignac man and the Neanderthal man, the Aurignac man resembling in many points the orang, the Neanderthal man resembling the gorilla.

In the first part of his paper Klaatsch only gives these "rather dry morphological facts." In the second part he proceeds to offer an explanation of these facts. As there is a close resemblance in morphological details of the Neanderthal race and the gorilla, and of the Aurignac race and the orang, he thinks that there must be a real blood-relation between the respective races. Klaatsch's idea, then, as to the descent of man is this. There was, originally, one group of primates, "propithecanthropoi," which, according to Klaatsch, resembled man more closely than any other now living primate. These gave origin, among others, to one group, out of which sprang the Neanderthal race and the gorilla. The Neanderthal man followed an upwards line in his development, the gorilla sank back, having become specialised in one direction, and by this being unfit for higher development. Klaatsch regards the gorilla and the other man-like apes as "failed experiments of man" (misslungene Versuche zur definitiven Menschwerdung).

In much the same way there sprang up another group, which developed into the Aurignac race and into the orang. So "the Aurignac man did not spring up from the Orang, just as the Neanderthal man did not spring up from the Gorilla" (p. 568, *loc. cit.*). How these two races of mankind reached Europe, Klaatsch tries to show in a sort of scheme, which has been published in NATURE already (November 24, 1910). The Neanderthal race came *via* Africa and Gibraltar, whilst the Aurignac race came *via* Asia.

Further on, Klaatsch thinks it possible that there are races who are related in the same way to the chimpanzee and to the gibbon. Other suggestions Prof. Klaatsch makes about the existing races and the other prehistoric races. According to him, the Galley Hill and "Brünn I" skull belong almost certainly to the Aurignac race, very likely also Chancelade and Engis! As to the existing races, Klaatsch thinks to have found a relation of negroes to the Neanderthal race. Otherwise his suggestions are very hypothetical, and only meant as a working hypothesis, so that it is no good now to consider them closely.